

IN THE CLAIMS:

1. (Amended) An isolated nucleic acid comprising between at least 12 consecutive nucleotides and all consecutive nucleotides in of a nucleotide sequence selected from SEQ ID NO: 1; SEQ ID NO: 2; SEQ ID NO:3; SEQ ID NO: 4; SEQ ID NO: 5; SEQ ID NO: 6; SEQ ID NO: 7; SEQ ID NO: 8; SEQ ID NO: 9; SEQ ID NO: 10; SEQ ID NO: 11; SEQ ID NO: 12; SEQ ID NO: 13; SEQ ID NO: 14; SEQ ID NO: 15; SEQ ID NO: 16; SEQ ID NO: 17; SEQ ID NO: 18; SEQ ID NO: 19; and SEQ ID NO: 20.
2. (Amended) The isolated nucleic acid of claim 1, wherein the nucleic acid comprises at least between 15 consecutive nucleotides and all consecutive nucleotides of the nucleotide sequence SEQ ID NOS: 1-20.
3. (Amended) The isolated nucleic acid of Claim 1, wherein the nucleic acid comprises at least between 18 consecutive nucleotides and all consecutive nucleotides of the nucleotide sequence SEQ ID NOS: 1-20.
4. (Amended) The isolated nucleic acid of claim 1, wherein the nucleic acid comprises a nucleotide sequence selected from SEQ ID NO: 1, complementary sequence of SEQ ID NO: 1, SEQ ID NO: 2; complementary sequence of SEQ ID NO: 2; SEQ ID NO: 3; complementary sequence of SEQ ID NO: 3; SEQ ID NO: 4; complementary sequence of SEQ ID NO: 4; SEQ ID NO: 5; complementary sequence of SEQ ID NO: 5; SEQ ID NO: 6; complementary sequence of SEQ ID NO: 6; SEQ ID NO: 7; complementary sequence of SEQ ID NO: 7; SEQ ID NO: 8; complementary sequence of SEQ ID NO: 8; SEQ ID NO: 9; complementary sequence of SEQ ID NO: 9; SEQ ID NO: 10; complementary sequence of SEQ ID NO: 10; SEQ ID NO: 11; complementary sequence of SEQ ID NO: 11; SEQ ID NO: 12; complementary sequence of SEQ ID NO: 12; SEQ ID NO: 13; complementary sequence of SEQ ID NO: 13; SEQ ID NO:14; complementary sequence of SEQ ID NO: 14; SEQ ID NO: 15; complementary sequence of SEQ ID NO: 15; SEQ ID NO: 16; complementary sequence of SEQ ID NO: 16; SEQ ID NO: 17; complementary sequence of SEQ ID NO: 17; SEQ ID NO: 18; complementary sequence of SEQ ID NO: 18; SEQ ID NO: 19; complementary sequence of SEQ ID NO: 19; SEQ ID NO: 20; and the complementary sequence of SEQ ID NO: 20.

5. (Original) The nucleic acid of Claim 4 immobilized on a solid surface.
6. (Amended) A pair of forward and reverse primers for amplification of VNTR located in DNA isolated from *Borrelia* species, said forward primer ~~recited before~~ having SEQ ID NO. 1 ~~and said reverse primer having SEQ ID NO. 2~~ the pairs comprising said pair of primers being selected from SEQ ID NOS: 1 AND 2; SEQ ID NOS: 3 AND 4; SEQ ID NOS: 5 AND 6; SEQ ID NOS: 7 AND 8; SEQ ID NOS: 9 AND 10; SEQ ID NOS: 11 AND 12; SEQ ID NOS: 13 AND 14; SEQ ID NOS: 15 AND 16; SEQ ID NOS: 17 AND 18; SEQ ID NOS: 19 AND 20; and a combination thereof.
- 7-15 (Cancelled)
16. (Amended) A pair of forward and reverse primers for amplification of VNTR in DNA isolated from *Borrelia* Species, of Claims 6-15 wherein a member of said pair comprises an observable marker, said pair of primers being selected from SEQ ID NOS: 1 AND 2; SEQ ID NOS: 3 AND 4; SEQ ID NOS: 5 AND 6; SEQ ID NOS: 7 AND 8; SEQ ID NOS: 9 AND 10; SEQ ID NOS: 11 AND 12; SEQ ID NOS: 13 AND 14; SEQ ID NOS: 15 AND 16; SEQ ID NOS: 17 AND 18; SEQ ID NOS: 19 AND 20; and a combination thereof.
17. (Original) The pair of Claim 16 wherein said marker is a fluorescent label or a radioactive group.
18. (Amended) A pair of claim 16 of forward and reverse primers of Claims 6-17 as PCR primers in the detection of a *Borrelia* species, said pair of primers being selected from SEQ ID NOS.: 1 AND 2; SEQ ID NOS: 3 AND 4; SEQ ID NOS: 5 AND 6; SEQ ID NOS: 7 AND 8; SEQ ID NOS: 9 AND 10; SEQ ID NOS: 11 AND 12; SEQ ID NOS: 13 AND 14; SEQ ID NOS: 15 AND 16; SEQ ID NOS: 17 AND 18; SEQ ID NOS: 19 AND 20; and a combo thereof.
19. (Amended) A method for detecting a *Borrelia* species comprising the steps of:
  - [i.]a) obtaining a DNA sample from said species,
  - [ii.]b) amplifying a VNTR marker loci in said DNA with a primer pair selected from said pair of primers being selected from SEQ ID NOS.: 1 AND 2; SEQ ID NOS: 3

AND 4; SEQ ID NOS: 5 AND 6; SEQ ID NOS: 7 AND 8; SEQ ID NOS: 9 AND 10;  
SEQ ID NOS: 11 AND 12; SEQ ID NOS: 13 AND 14; SEQ ID NOS: 15 AND 16; SEQ  
ID NOS: 17 AND 18; SEQ ID NOS: 19 AND 20; and a combination thereof.

~~of Claims 6-17;~~ and

[iii.]c) detecting an amplification product that contains the VNTR sequence.

20. (Amended) A kit for the detection of a *Borrelia* species comprising at least one a  
primer pair said pair of primers being selected from SEQ ID NOS.: 1 AND 2; SEQ ID NOS: 3  
AND 4; SEQ ID NOS: 5 AND 6; SEQ ID NOS: 7 AND 8; SEQ ID NOS: 9 AND 10; SEQ ID  
NOS: 11 AND 12; SEQ ID NOS: 13 AND 14; SEQ ID NOS: 15 AND 16; SEQ ID NOS: 17  
AND 18; SEQ ID NOS: 19 AND 20; and a combination thereof ~~of Claims 6-17.~~

21. (Amended) The kit of Claim 20 further comprising ~~in addition~~ nucleic acids, enzymes  
and buffers suitable for causing amplification of VNTR in DNA from said species in a PCR  
instrument.

22. (Amended) A kit for detecting a *Borrelia* species comprising:

[i.]a) one or more primer pairs ~~of Claim 6-15~~ selected from SEQ ID NOS.: 1  
AND 2; SEQ ID NOS: 3 AND 4; SEQ ID NOS: 5 AND 6; SEQ ID NOS: 7 AND 8;  
SEQ ID NOS: 9 AND 10; SEQ ID NOS: 11 AND 12; SEQ ID NOS: 13 AND 14;  
SEQ ID NOS: 15 AND 16; SEQ ID NOS: 17 AND 18; SEQ ID NOS: 19 AND 20;  
and a combo thereof;

[ii.]b) nucleic acids having an observable marker;

[iii.]c) a transcriptase; and

[iv.]d) buffers and salts suitable for causing polymerization of VNTR in DNA  
from said *Borrelia* species in a PCR instrument.

23. (Amended) The kit of Claim 22 for multiplexing DNA from a *Borrelia* species  
wherein said kit comprises mixtures of at least two ~~said~~ primer pairs.

24. (Amended) A method of sub-typing a *Borrelia* strain comprising the steps of:

[i.]a) obtaining DNA from said strain;

[ii.]b) amplifying said DNA with one or more primer pairs selected from ~~Claim~~  
~~6-17;~~

[iii.]c) detecting said amplified product;  
[iv.]d) determining [the] a diversity number [of] for said amplified product; and  
[v.]e) comparing said diversity number with the diversity number for a known strain of *Borrelia*.